



## General

### Guideline Title

Clinical policy: critical issues in the evaluation and management of adult patients with suspected acute nontraumatic thoracic aortic dissection.

### Bibliographic Source(s)

Diercks DB, Promes SB, Schuur JD, Shah K, Valente JH, Cantrill SV, American College of Emergency Physicians. Clinical policy: critical issues in the evaluation and management of adult patients with suspected acute nontraumatic thoracic aortic dissection. *Ann Emerg Med*. 2015 Jan;65(1):32-42.e12. [56 references] [PubMed](#)

### Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

## Recommendations

### Major Recommendations

Definitions for the strength of evidence (Class I-III) and strength of recommendations (Level A-C) are provided at the end of the Major Recommendations.

1. In adult patients with suspected acute nontraumatic thoracic aortic dissection, are there clinical decision rules that identify a group of patients at very low risk for the diagnosis of thoracic aortic dissection?

*Level A recommendations.* None specified.

*Level B recommendations.* None specified.

*Level C recommendations.* In an attempt to identify patients at very low risk for acute nontraumatic thoracic aortic dissection, do not use existing clinical decision rules alone. The decision to pursue further workup for acute nontraumatic aortic dissection should be at the discretion of the treating physician.

2. In adult patients with suspected acute nontraumatic thoracic aortic dissection, is a negative serum D-dimer sufficient to identify a group of patients at very low risk for the diagnosis of thoracic aortic dissection?

*Level A recommendations.* None specified.

*Level B recommendations.* None specified.

*Level C recommendations.* In adult patients with suspected nontraumatic thoracic aortic dissection, do not rely on D-dimer alone to exclude

the diagnosis of aortic dissection.

3. In adult patients with suspected acute nontraumatic thoracic aortic dissection, is the diagnostic accuracy of computed tomography angiogram (CTA) at least equivalent to transesophageal echocardiogram (TEE) or magnetic resonance angiogram (MRA) to exclude the diagnosis of thoracic aortic dissection?

*Level A recommendations.* None specified.

*Level B recommendations.* In adult patients with suspected nontraumatic thoracic aortic dissection, emergency physicians may use CTA to exclude thoracic aortic dissection because it has accuracy similar to that of TEE and MRA.

*Level C recommendations.* None specified.

4. In adult patients with suspected acute nontraumatic thoracic aortic dissection, does an abnormal bedside transthoracic echocardiogram (TTE) establish the diagnosis of thoracic aortic dissection?

*Level A recommendations.* None specified.

*Level B recommendations.* In adult patients with suspected nontraumatic thoracic aortic dissection, do not rely on an abnormal bedside TTE result to definitively establish the diagnosis of thoracic aortic dissection.

*Level C recommendations.* In adult patients with suspected nontraumatic thoracic aortic dissection, immediate surgical consultation or transfer to a higher level of care should be considered if a TTE is suggestive of aortic dissection. (Consensus recommendation)

5. In adult patients with acute nontraumatic thoracic aortic dissection, does targeted heart rate and blood pressure lowering reduce morbidity or mortality?

*Level A recommendations.* None specified.

*Level B recommendations.* None specified.

*Level C recommendations.* In adult patients with acute nontraumatic thoracic aortic dissection, decrease blood pressure and pulse if elevated. However, there are no specific targets that have demonstrated a reduction in morbidity and mortality.

#### Definitions:

#### Strength of Evidence

#### Literature Classification Schema\*

Design/Class	Therapy†	Diagnosis‡	Prognosis§
1	Randomized, controlled trial or meta-analysis of randomized trials	Prospective cohort using a criterion standard or meta-analysis of prospective studies	Population prospective cohort or meta-analysis of prospective studies
2	Nonrandomized trial	Retrospective observational	Retrospective cohort Case control
3	Case series Case report Other (e.g., consensus, review)	Case series Case report Other (e.g., consensus, review)	Case series Case report Other (e.g., consensus, review)

\*Some designs (e.g., surveys) will not fit this schema and should be assessed individually.

†Objective is to measure therapeutic efficacy comparing interventions.

‡Objective is to determine the sensitivity and specificity of diagnostic tests.

§Objective is to predict outcome, including mortality and morbidity.

#### Approach to Downgrading Strength of Evidence\*

	Design/Class		
Downgrading	1	2	3
None	I	II	III
1 Level	II	III	X
2 Levels	III	X	X
Fatally Flawed	X	X	X

\*See the "Description of Methods Used to Analyze the Evidence" field for more information.

Strength of recommendations regarding each critical question were made by subcommittee members using results from strength of evidence grading, expert opinion, and consensus among subcommittee members according to the following guidelines:

#### Strength of Recommendations

Level A recommendations. Generally accepted principles for patient care that reflect a high degree of clinical certainty (i.e., based on evidence from 1 or more Class of Evidence I or multiple Class of Evidence II studies).

Level B recommendations. Recommendations for patient care that may identify a particular strategy or range of strategies that reflect moderate clinical certainty (i.e., based on evidence from 1 or more Class of Evidence II studies or strong consensus of Class of Evidence III studies).

Level C recommendations. Recommendations for patient care that are based on evidence from Class of Evidence III studies or, in the absence of any adequate published literature, based on expert consensus. In instances where consensus recommendations are made, "consensus" is placed in parentheses at the end of the recommendation.

There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. Factors such as heterogeneity of results, uncertainty about effect magnitude and consequences, and publication bias, among others, might lead to such a downgrading of recommendations.

## Clinical Algorithm(s)

None provided

## Scope

## Disease/Condition(s)

Acute nontraumatic thoracic aortic dissection

## Guideline Category

Diagnosis

Evaluation

Management

Risk Assessment

## Clinical Specialty

Cardiology

Critical Care

Emergency Medicine

Thoracic Surgery

## Intended Users

Hospitals

Physician Assistants

Physicians

## Guideline Objective(s)

- To address key issues in the evaluation and management of patients with suspected acute nontraumatic thoracic aortic dissection
- To answer the following critical questions:
  - In adult patients with suspected acute nontraumatic thoracic aortic dissection, are there clinical decision rules that identify a group of patients at very low risk for the diagnosis of thoracic aortic dissection?
  - In adult patients with suspected acute nontraumatic thoracic aortic dissection, is a negative serum D-dimer sufficient to identify a group of patients at very low risk for the diagnosis of thoracic aortic dissection?
  - In adult patients with suspected acute nontraumatic thoracic aortic dissection, is the diagnostic accuracy of computed tomography angiogram (CTA) at least equivalent to transesophageal echocardiogram (TEE) or magnetic resonance angiogram (MRA) to exclude the diagnosis of thoracic aortic dissection?
  - In adult patients with suspected acute nontraumatic thoracic aortic dissection, does an abnormal bedside transthoracic echocardiogram (TTE) establish the diagnosis of thoracic aortic dissection?
  - In adult patients with acute nontraumatic thoracic aortic dissection, does targeted heart rate and blood pressure lowering reduce morbidity or mortality?

## Target Population

Adult patients aged 18 years and older presenting to the emergency department (ED) with suspected acute nontraumatic thoracic aortic dissection

Note: This guideline is not intended to be used for patients with traumatic aortic dissection, for pediatric patients, or for pregnant patients.

## Interventions and Practices Considered

1. Avoiding reliance on existing clinical decision rules alone to identify patients at very low-risk (further workup at physician's discretion)
2. Avoiding reliance on D-dimer testing alone to exclude the diagnosis
3. Use of computed tomography angiogram (CTA) diagnostic testing
4. Avoiding reliance on abnormal bedside transthoracic echocardiogram (TTE) for definitive diagnosis
5. Decreasing blood pressure and pulse if elevated (no specific targets established)

## Major Outcomes Considered

Reduction of morbidity and mortality

## Methodology

### Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

## Description of Methods Used to Collect/Select the Evidence

This clinical policy was created after careful review and critical analysis of the medical literature and was based on a systematic review of the literature. Searches of MEDLINE, MEDLINE InProcess, Cochrane Database of Abstracts of Reviews of Effects, Web of Science's Cited Reference Search, and Scopus were performed. All searches were limited to English-language sources, human studies, adults, and years January 2000 through April 2012; searches were conducted on April 30, 2012, and May 3, 2012. Specific key words/phrases and years used in the searches are identified in the original guideline document under each critical question. In addition, relevant articles from the bibliographies of included studies and more recent articles identified by committee members and reviewers were included.

## Number of Source Documents

- Critical question #1: Forty-five articles were identified in the search. Seventeen articles were selected from the search results for further review. One additional article was identified and added at the review stage, with 4 studies included for this critical question recommendation.
- Critical question #2: Eighty-two articles were identified in the search. Twenty-four articles were selected from the search results for further review. One additional article was identified and added at the review stage, with 11 studies included for this critical question recommendation.
- Critical question #3: Sixty-nine articles were identified in the search. Fifteen articles were selected from the search results for further review, with 6 studies included for this critical question recommendation.
- Critical question #4: Fifty-one articles were identified in the search. Thirty-six articles were selected from the search results for further review, with 6 studies included for this critical question recommendation.
- Critical question #5: Fifty-five articles were identified in the search. Thirty-seven articles were selected from the search results for further review, with 1 study included for this critical question recommendation.

## Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

## Rating Scheme for the Strength of the Evidence

### Strength of Evidence

Literature Classification Schema\*

Design/Class	Therapy†	Diagnosis‡	Prognosis§
1	Randomized, controlled trial or meta-analysis of randomized trials	Prospective cohort using a criterion standard or meta-analysis of prospective studies	Population prospective cohort or meta-analysis of prospective studies
2	Nonrandomized trial	Retrospective observational	Retrospective cohort Case control
3	Case series Case report Other (e.g., consensus, review)	Case series Case report Other (e.g., consensus, review)	Case series Case report Other (e.g., consensus, review)

\*Some designs (e.g., surveys) will not fit this schema and should be assessed individually.

†Objective is to measure therapeutic efficacy comparing interventions.

‡Objective is to determine the sensitivity and specificity of diagnostic tests.

§Objective is to predict outcome, including mortality and morbidity.

Approach to Downgrading Strength of Evidence\*

Downgrading	Design/Class		
	1	2	3
None	I	II	III
1 Level	II	III	X
2 Levels	III	X	X
Fatally Flawed	X	X	X

\*See the "Description of Methods Used to Analyze the Evidence" field for more information.

## Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

## Description of the Methods Used to Analyze the Evidence

All articles used in the formulation of this clinical policy were graded by at least 2 subcommittee members and assigned a Class of Evidence. In doing so, subcommittee members assigned design classes to each article, with design 1 representing the strongest study design and subsequent design classes (e.g., design 2, design 3) representing respectively weaker study designs for therapeutic, diagnostic, or prognostic clinical reports, or meta-analyses (see the "Rating Scheme for the Strength of the Evidence" field). Articles were then graded on dimensions related to the study's methodological features, including but not necessarily limited to randomization processes, blinding, allocation concealment, methods of data collection, outcome measures and their assessment, selection and misclassification biases, sample size, and generalizability. Using predetermined formulas related to the study's design, methodological quality, and applicability to the critical question, articles received a final Class of Evidence grade (i.e., Class I, Class II, Class III, or Class X) (see the "Rating Scheme for the Strength of the Evidence" field). Articles identified with fatal flaws or that were not applicable to the critical question received a Class of Evidence grade "X" and were not used in formulating recommendations for this policy. Grading was done with respect to the specific critical questions; thus, the level of evidence for any one study may vary according to the question for which it is being considered. As such, it was possible for a single article to receive different Classes of Evidence as different critical questions were answered from the same study. Question-specific Classes of Evidence grading may be found in the Evidentiary Table included at the end of the original guideline document.

## Methods Used to Formulate the Recommendations

Expert Consensus

## Description of Methods Used to Formulate the Recommendations

This policy is a product of the American College of Emergency Physicians (ACEP) clinical policy development process, including expert review, and is based on the existing literature; when literature was not available, consensus of emergency physicians was used.

When possible, clinically oriented statistics (e.g., likelihood ratios, number needed to treat) were presented to help the reader better understand

how the results may be applied to the individual patient. For a definition of these statistical concepts, see Appendix C in the original guideline document.

## Rating Scheme for the Strength of the Recommendations

Strength of recommendations regarding each critical question were made by subcommittee members using results from strength of evidence grading, expert opinion, and consensus among subcommittee members according to the following guidelines:

### Strength of Recommendations

Level A recommendations. Generally accepted principles for patient care that reflect a high degree of clinical certainty (i.e., based on evidence from 1 or more Class of Evidence I or multiple Class of Evidence II studies).

Level B recommendations. Recommendations for patient care that may identify a particular strategy or range of strategies that reflect moderate clinical certainty (i.e., based on evidence from 1 or more Class of Evidence II studies or strong consensus of Class of Evidence III studies).

Level C recommendations. Recommendations for patient care that are based on evidence from Class of Evidence III studies or, in the absence of any adequate published literature, based on expert consensus. In instances where consensus recommendations are made, "consensus" is placed in parentheses at the end of the recommendation.

There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. Factors such as heterogeneity of results, uncertainty about effect magnitude and consequences, and publication bias, among others, might lead to such a downgrading of recommendations.

## Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

## Method of Guideline Validation

External Peer Review

Internal Peer Review

## Description of Method of Guideline Validation

Expert review comments were received from emergency physicians, cardiologists, and vascular surgeons, including individual members of the American Heart Association and the Society for Vascular Surgery, and the American College of Emergency Physicians' (ACEP) Quality and Performance Committee. Comments were received from ACEP members during a 60-day open comment period, with notices of the comment period sent in e-mails, published in *EMToday*, and posted on the ACEP Web site. The responses were used to further refine and enhance this policy; however, the responses do not imply endorsement of this clinical policy.

This clinical policy was approved by the ACEP Board of Directors, October 30, 2014.

This guideline was endorsed by the Emergency Nurses Association, November 20, 2014.

## Evidence Supporting the Recommendations

### Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

# Benefits/Harms of Implementing the Guideline Recommendations

## Potential Benefits

### Potential Benefits of Implementing the Recommendations

- Clinicians recognize the limitations of using clinical decision rules alone to risk stratify patients with suspected acute nontraumatic thoracic aortic dissection.
- In emergency department (ED) patients with suspected acute nontraumatic thoracic aortic dissection, the recommendations can help clinicians recognize the limitations of a negative D-dimer result in the setting of suspicion for disease.
- Potential benefits of computed tomography angiogram (CTA) include ready availability, rapid diagnosis of nontraumatic aortic dissection, and potential identification of alternative disorders.
- In adult patients with suspected acute nontraumatic thoracic aortic dissection, implementing the recommendation will avoid patients being directed to inappropriate intervention on the basis of a false-positive echocardiography result.
- Decreasing heart rate and blood pressure may reduce the risk of further dissection and improve outcomes.

## Potential Harms

### Potential Harms of Implementing the Recommendations

- The use of D-dimer may lead to unnecessary advanced imaging and exposure to radiation.
- Potential harms of computed tomography angiogram (CTA) include adverse events due to risks of intravenous contrast administration such as anaphylaxis, contrast-induced nephropathy, local contrast extravasation, and radiation exposure.
- Lack of reliance on bedside transthoracic echocardiogram (TTE) results to establish the diagnosis may result in delay of diagnosis and additional testing.
- Reducing blood pressure and heart rate aggressively in select patients may result in adverse events, such as in patients with severe aortic insufficiency or pericardial tamponade.

## Qualifying Statements

### Qualifying Statements

- Policy statements and clinical policies are the official policies of the American College of Emergency Physicians (ACEP) and, as such, are not subject to the same peer review process as articles appearing in the journal. Policy statements and clinical policies of the ACEP do not necessarily reflect the policies and beliefs of *Annals of Emergency Medicine* and its editors.
- This policy is not intended to be a complete manual on the evaluation and management of patients with suspected acute nontraumatic thoracic aortic dissection but rather a focused examination of critical issues that have particular relevance to the current practice of emergency medicine.
- It is the goal of the Clinical Policies Committee to provide an evidence-based recommendation when the medical literature provides enough quality information to answer a critical question. When the medical literature does not contain adequate empirical data to answer a critical question, the members of the Clinical Policies Committee believe that it is equally important to alert emergency physicians to this fact.
- This clinical policy is not intended to represent a legal standard of care for emergency physicians. Recommendations offered in this policy are not intended to represent the only diagnostic or management options available to the emergency physician. The ACEP recognizes the importance of the individual physician's judgment and patient preferences. This guideline defines for the physician those strategies for which medical literature exists to provide support for answers to the critical questions addressed in this policy.

## Implementation of the Guideline

### Description of Implementation Strategy



An implementation strategy was not provided.

# Institute of Medicine (IOM) National Healthcare Quality Report Categories

## IOM Care Need

Getting Better

## IOM Domain

Effectiveness

Patient-centeredness

Timeliness

## Identifying Information and Availability

### Bibliographic Source(s)

Diercks DB, Promes SB, Schuur JD, Shah K, Valente JH, Cantrill SV, American College of Emergency Physicians. Clinical policy: critical issues in the evaluation and management of adult patients with suspected acute nontraumatic thoracic aortic dissection. Ann Emerg Med. 2015 Jan;65(1):32-42.e12. [56 references] [PubMed](#)

### Adaptation

Not applicable: The guideline was not adapted from another source.

### Date Released

2015 Jan

### Guideline Developer(s)

American College of Emergency Physicians - Medical Specialty Society

### Source(s) of Funding

The American College of Emergency Physicians (ACEP) was the funding source for this clinical policy.

### Guideline Committee

American College of Emergency Physicians Clinical Policies Subcommittee (Writing Committee) on Thoracic Aortic Dissection

## Composition of Group That Authored the Guideline

*Writing Committee Members:* Deborah B. Diercks, MD, MSc (*Subcommittee Chair*); Susan B. Promes, MD, MBA; Jeremiah D. Schuur, MD, MHS; Kaushal Shah, MD; Jonathan H. Valente, MD; Stephen V. Cantrill, MD (*Committee Chair*)

*American College of Emergency Physicians Clinical Policies Committee (Oversight Committee):* Stephen V. Cantrill, MD (*Chair 2014*); Michael D. Brown, MD, MSc; John H. Burton, MD; Deborah B. Diercks, MD, MSc; Seth R. Gemme, MD (EMRA Representative 2013-2014); Charles J. Gerardo, MD; Steven A. Godwin, MD; Sigrid A. Hahn, MD; Jason S. Haukoos, MD, MSc (Methodologist); J. Stephen Huff, MD; Bruce M. Lo, MD, CPE, RDMS; Sharon E. Mace, MD; Michael D. Moon, PhD, RN, CNS-CC, CEN (ENA Representative 2013-2014); Devorah J. Nazarian, MD; Susan B. Promes, MD, MBA; Kaushal Shah, MD; Richard D. Shih, MD; Scott M. Silvers, MD; Michael D. Smith, MD, MBA; Christian A. Tomaszewski, MD, MS, MBA; Jonathan H. Valente, MD; Stephen J. Wolf, MD; Robert E. O'Connor, MD, MPH (Board Liaison 2010-2014); Rhonda R. Whitson, RHIA, Staff Liaison

## Financial Disclosures/Conflicts of Interest

Relevant industry relationships: There were no relevant industry relationships disclosed by the subcommittee members.

Relevant industry relationships are those relationships with companies associated with products or services that significantly impact the specific aspect of disease addressed in the critical question.

## Guideline Endorser(s)

Emergency Nurses Association - Professional Association

## Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

## Guideline Availability

Electronic copies: Available from the [American College of Emergency Physicians \(ACEP\) Web site](#) .

## Availability of Companion Documents

The following are available:

- American College of Emergency Physicians clinical policy development. 3 p. Electronic copies: Available from the [American College of Emergency Physicians \(ACEP\) Web site](#) .
- ACEP clinical policy development process. Flow chart. 1 p. Electronic copies: Available from the [ACEP Web site](#) .

## Patient Resources

None available

## NGC Status

This NGC summary was completed by ECRI Institute on January 28, 2015. The information was verified by the guideline developer on February 27, 2015.

## Copyright Statement

This NGC summary is based on the original guideline, which is subject to the guideline developer's copyright restrictions. For more information, please refer to the [American College of Emergency Physicians \(ACEP\) Web site](#) .

## Disclaimer

### NGC Disclaimer

The National Guideline Clearinghouse<sup>®</sup> (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria which may be found at <http://www.guideline.gov/about/inclusion-criteria.aspx>.

NGC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or clinical efficacy or effectiveness of the clinical practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI Institute, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.